

# STAGE-GATE® PROCESS FOR NEW PRODUCT SUCCESS

By Robert G. Cooper and Elko J. Kleinschmidt - Edited by Jens Arleth  
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## NEW PRODUCTS ARE MORE VITAL THAN EVER

New products are becoming still more vital to success, prosperity, and even corporate survival. Chances are that the companies doing well today are succeeding because of sound new product decisions made in the last decade or two. Losing the battle spells disaster. Companies simply disappear because they fail to innovate, fail to keep their product portfolio current and competitive, and are surpassed by more innovative competitors.

Here, we first look at past successes and failures on the new product battlefield and draw nine key lessons for success. They are based on rigorous research, including R. G. Cooper's NewProd studies which address the question, "What separates winners from losers?"

These nine lessons lead us to a game plan - a process template for driving new products to market quickly and efficiently, which a number of

leading firms in Europe and North America have used successfully. Superior products delivering real and unique benefits to users succeed far better than "me too" products with few positive elements of differentiation. Exhibit 1 shows the relationships. When we compared the top 20% of products in terms of product superiority to the bottom 20% (the least differentiated), the superior products had five times the success rate, in terms of the manufacturer's success criteria. Here, we define success and failure from a financial, or profitability, standpoint: the degree to which the new product's profits exceeded or fell short of the firm's hurdle rate for this type of investment.

Superior products with unique benefits outscored the others on every other measure of performance as well, by considerable margins, as assessed by knowledgeable managers and project teams.

They captured a much higher market share, by more than 40 share points. They also enjoy higher profitability. Superior products were much more likely to meet company sales and profit objectives.

### ***Lesson 1: A Better Product Matters***

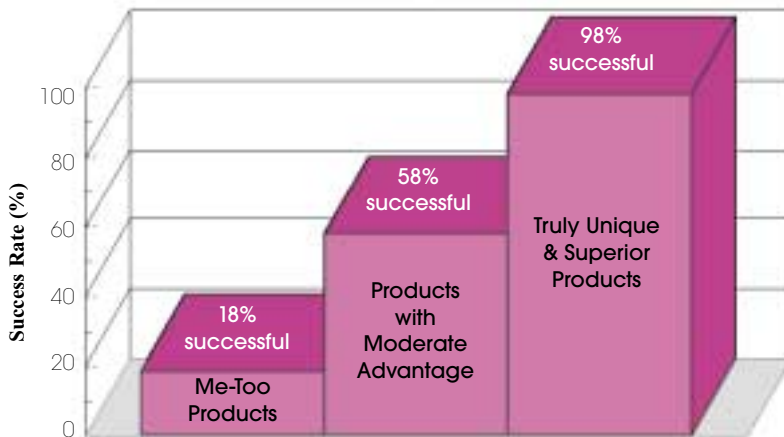
*The number one success factor is a unique superior product - a differentiated product that delivers unique benefits and superior value to the customer.*

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## EXECUTIVE BRIEFING

New products are critical to the growth, prosperity, and survival of the modern corporation.

Nine key lessons for new product success improve the chances of winning and reduce the time-to-market. These lessons build on the NewProd studies of more than 2,000 new product launches, successful or otherwise, by hundreds of firms. The Stage-Gate system, a new tool for managing the product innovation process, builds on those nine lessons. Stage-Gate models have been successfully implemented around the world in many leading companies in the last half-dozen years.

**Exhibit 1****IMPACT OF PRODUCT SUPERIORITY ON SUCCESS**

Source: RG Cooper, *Winning at New Products*

Such results, though no surprise to leading product innovators, are apparently not obvious to everyone. We've found that "tired products" and "me too" offerings are the rule rather than the exception in many firms' new product efforts - and 82% of such efforts fail.

What do superior products with real customer benefits have in common? They offer unique features not available on competitive products. They meet customer needs better than competitive products. They solve problems customers had with competitive products. And they reduce the customer's total costs, providing high value-in-use.

**Lesson 2: Market Orientation - Is Essential**

*Strong market orientation - a customer focused new product process is critical to success.*

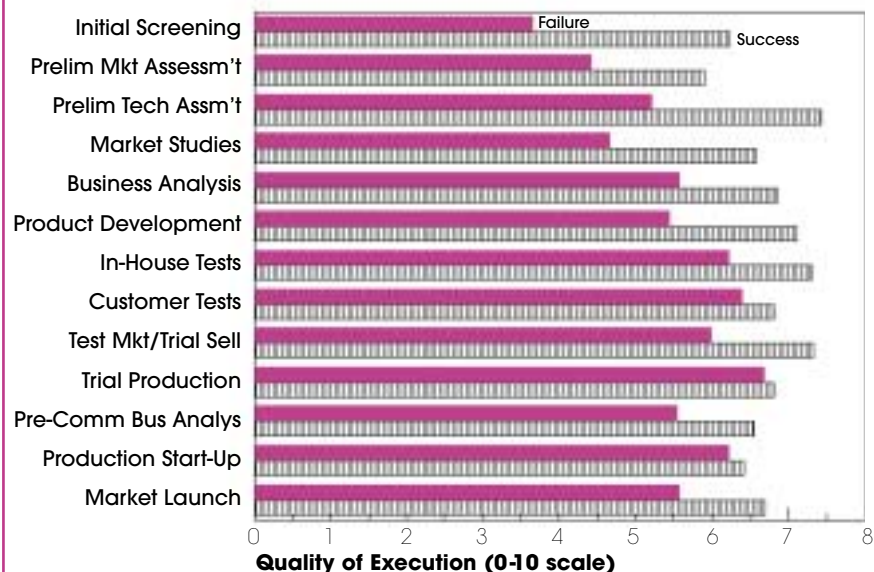
A thorough understanding of customers' needs and wants, the competitive situation, and the nature of the market is an essential component of new product success. Need recognition, understanding user needs, market need satisfaction, constant customer contact, strong market knowledge, undertaking market research, quality of marketing

execution, and more spending on up-front marketing activities are recurring themes throughout the many studies that have probed what makes a winner.

Conversely, failing to adopt a strong market orientation in product innovation, an unwillingness to undertake essential market assessments, and leaving the customer out of product development spells disaster.

In our studies, we have examined 13 key activities from initial screening to product launch. Exhibit 2 shows the mean "quality of execution" ratings that project managers assigned to these 13 actions, for product successes vs. failures. We also looked at how much money and effort went to each activity. It is notable how much marketing actions discriminated between winners and losers.

- For the five marketing actions listed in Exhibit 2, quality of execution was rated higher for the successful products than for the failures.
- Companies devoted three times as many person-days and twice as much money to preliminary market assessments for successful projects, compared to failures.
- Companies spent twice as much on market research, in both dollars and person-days, in successful projects than in failures.

**Exhibit 2****QUALITY-OF-EXECUTION: IMPACT ON SUCCESS**

Sadly, a strong market orientation is missing in the majority of firms' new product projects. For example, we found that 75% of new product projects' studies omitted a detailed market study. Marketing activities were rated the poorest of all steps of the entire new product process. Moreover, companies spend relatively few resources and little money on marketing actions: only 16% of the effort and 32% of dollar expenditures in the typical project.

### ***Lesson 3: Do your Homework***

*More pre-development work must be done before product development gets under way.*

Homework is critical to winning. The steps before product development such as product screening, market studies, technical feasibility assessment, and building the business case are key factors separating winners from losers.

In Exhibit 2, the greatest differences between winners and losers occur in the top half of the diagram with the up-front or homework activities that precede development. The quality of execution of these pre-development steps - is closely tied to the product's financial performance. Successful projects have more than 1.75 times as many person-days spent on pre-development steps as do failures.

"More homework means longer development times," is a frequent complaint. This is a valid concern, but experience shows that homework pays for itself in reduced development times as well as improved success rates, primarily for three reasons:

1. Product failure is much more likely if the homework is omitted.
2. Better project definition, the result of sound homework, actually speeds up the development process. Poorly defined projects with vague targets and moving goal posts often eat up a lot of time due to recycling back and redoing development work.
3. The time to make the majority of design improvements or changes is not as the product is moving into production. More homework up front anticipates changes and encourages them to occur earlier in the process, rather than later, when they are more costly.

### ***Lesson 4: Define The Project Early***

*Sharp and early product definition is one of the key differences between winning and losing at new products.*

How well the project is defined before entering the development phase is a key success factor. The NewProd studies find that successful products had much sharper definition before development and were more than three times as likely to be successful. They achieved much higher market share, by 38 points on average, and they tended to meet company sales and profit objectives much more often than lesser efforts (see Exhibit 3). A good definition before the door is opened to a full development program includes:

- Specify target markets, the intended users.
- Describe the product concept and the benefits to be delivered.
- Delineate the positioning strategy.
- Prioritise product features, attributes, requirements, and specifications by "must have" and "would like to have" criteria.

### ***Lesson 5: Promote Cross-Functional Effort***

*The right organisational structure is a key factor in success.*

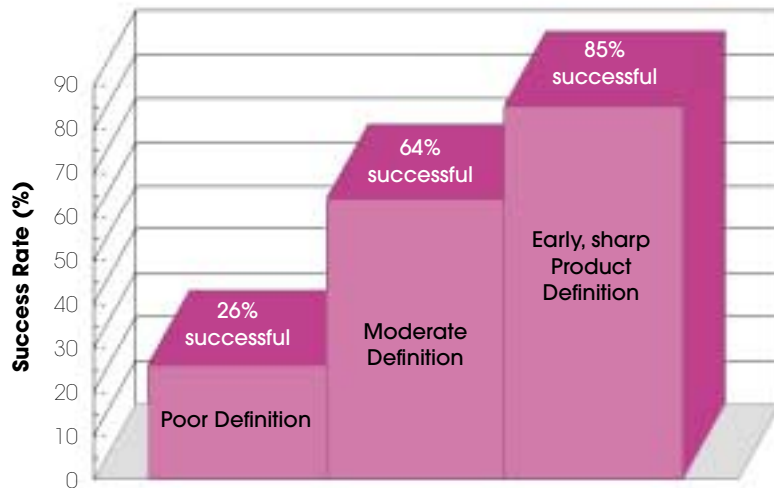
Product innovation is not a one-department show, but a multidisciplinary, cross-functional effort. The evidence is compelling. Projects are more likely to be successful when handled by cross-functional teams dedicated to the projects, accountable for them from idea to launch, and led by strong leader-champions having top management support.

How does one design a process that integrates many activities and multi-functional inputs? One answer is to develop a systematic approach to product innovation, a process that cuts across departmental boundaries and forces the active participation of people from different functions, such as the Stage-Gate approach we will explain later in this article. Organisational design is just as important. The traditional functional organisation structure does not suit many of the needs of product innovation. Indeed, functional and functional matrix approaches led to the least new product success, according to one extensive study on new pro-

ducts Companies must move to team approaches that cut across functional lines. More autonomy and clear empowerment must be given to the project leader and the team.

**Exhibit 3**

### IMPACT OF EARLY, SHARP PRODUCT DEFINITION



Source: RG Cooper, *Winning at New Products*

#### **Lesson 6: Spot your Winner Early**

*New product success is predictable, and the profile of a winner can be used to make sharper project selection decisions.*

Most companies do not have effective project evaluations and priorities. One result is too many projects for their resources. Furthermore resources are wasted on weak projects and some of the truly meritorious ones are starved. Solving this allocation problem requires management to make tough go/kill decisions.

In most firms, however, project evaluations are either weak, deficient, or non-existent. Our NewProd studies find that initial screening is one of the most poorly handled activities of the entire new product process.

Many managers confess that ventures simply aren't killed once they're into development: "Projects get a life of their own," as one put it.

Often the problem of poor project evaluation boils down to a lack of criteria against which to judge projects. Fortunately, new product success is fairly predictable; certain project characteristics separate winners from losers, and should be used as evaluation criteria.

For instance, three important factors which consistently differentiate successful from unsuccessful projects include product superiority, synergy, and market attractiveness. Those three factors, and the list of items that comprise them, should be an integral part of firms' screening and project evaluation decisions.

#### **Lesson 7: Control your Way towards Success**

*New product success is controllable. More emphasis is needed on completeness, consistency, and quality of execution.*

Quality of execution of the project is the key to success. Exhibit 3 clearly shows the impact of quality of execution of technological, marketing, and pre-development activities.

Here we look at "quality of execution" comparing the top 20% of projects to the bottom 20%. Projects with well-executed marketing actions were 2.2 times as successful as those receiving weak marketing. Those with well-executed technological activities were 2.6 times as successful. Projects with pre-development activities executed in a quality fashion were 2.4 times as successful.

The men and women controlling new product projects must strive for significant improvements in the way the innovation process unfolds. The solution that some firms have adopted is to treat product innovation as a process with quality-of-execution checkpoints. They design quality into their game plan by making it mandatory to include certain key activities and actions that are often omitted, yet are central to success.

### ***Lesson 8: Be Careful with Speed!***

*Speed is everything! But not at the expense of quality of execution.*

Speed yields competitive advantage - the first on the market. It means launching products with less likelihood that the market or competitive situation has changed. It results in quicker realisation of profit.

So there are many reasons for speeding up the development process. Be careful, however. Fast development is not a goal in itself. The real goal is to become more successful, to sell more and to generate more profit.

Unfortunately, many of the practices naively employed to reduce time-to-market ultimately cost the company money. The product get to market faster but runs into difficulties.

An example is quickly moving a product to market by shortening the customer test phase, only to incur product reliability problems after launch, lost customer confidence, and substantial warranty and servicing costs. Be careful in your quest for cycle time reduction. Too often the methods used to reduce development time yield the opposite effect. In many cases they are very costly and conflict with sound management practice.

### **REDUCING CYCLE TIME**

Here are five sensible ways to reduce cycle time - ways that are totally consistent with sound management practice and are derived from our lessons for success. They will not only increase the odds of winning, but also reduce the time-to-market.

- Do it right the first time. Build in quality of execution at every stage of the project. The best way to save time is by avoiding having to do it again. (See Lesson 7.)
- Do the up-front homework and provide clear project definition, based on fact rather than speculation. That saves time downstream, requiring less recycling back to get the facts or redefine the product requirements. (See Lesson 3.)
- Organise around an empowered multi-functional team. Sadly, the typical project resembles a relay race, with each function or department carrying the baton for its stretch, then handing off to the next runner or department. (See Lesson 5.)

- Parallel process. The rugby game is a better model, with activities proceeding concurrently rather than sequentially. More gets done per unit time as each part of the team - marketing, R&D, manufacturing, and engineering - work together simultaneously. Because parallel play is a lot more complex than a series approach, the new product process demands a disciplined game plan. (See Lesson 9.)
- Prioritise and focus. The best way to slow projects down is to spread limited resources and people too thinly across too many projects. Concentrating on the truly meritorious projects will improve the quality and speed of the work. That means tough choices, however, and perhaps killing some promising projects. One must apply the right criteria for making go/kill decisions. (See Lesson 6.)

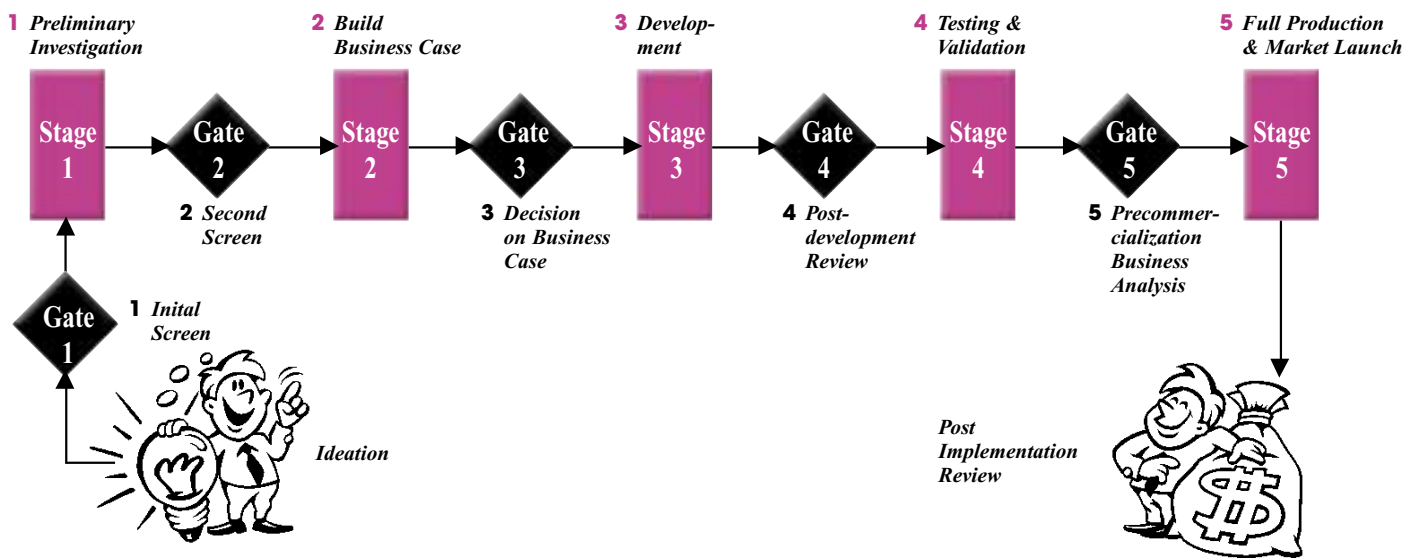
### ***Lesson 9: Multitasking The Process***

*Companies that follow a disciplined, multistage, new product game plan fare much better.*

A game plan or formal new product process - a "Stage-Gate system" - is the solution to which many firms have turned to overcome deficiencies plaguing their new product programs. Strong evidence supports the approach. In one study, we examined what happened at 21 leading firms that implemented Stage-Gate plans. The results were dramatic:

- Improved teamwork.
- Less recycling and less rework.
- Improved success rates.
- Earlier failure detection.
- Better launches.
- Shorter cycle times.





# THE STAGE-GATE® NEW PRODUCT PROCESS

Many leading firms have developed a systematic Stage-Gate process for moving a new product project through the various steps from idea to launch. Most important, they have built the key lessons into the road map for new product success in order to improve the effectiveness and timeliness of their projects.

Stage-Gate breaks the innovation process into a predetermined set of stages, each consisting of prescribed, multifunctional, and parallel activities. The model above illustrates the process flow. The entrance to each stage is a decision gate, a checkpoint for a go or kill decision. Many other names have been used to describe similar formats, among them "product delivery process," "new product process," "gating system," and "product launch system."

The Stage-Gate concept is based on the experiences, suggestions, and observations of a large number of managers and firms, and on our own and others' research in the field.

Since the Stage-Gate system first appeared in print, it has been implemented in whole or in part by dozens of firms in North America, including Exxon Chemicals, Procter & Gamble, Du Pont, Polaroid, US West, B.F. Goodrich, Corning Glass, Labatts, the Royal Bank of Canada, and Rohm & Haas - all of which have provided an excellent laboratory setting to further refine and improve the concept.

In Europe, firms such as ICI, Wawin division of Shell, Carlsberg, Hercules Copenhagen, Courtaldis, and LEGO provide similarly successful examples, as do many other firms world-wide.

The Stage-Gate system breaks the new product project into discrete and identifiable stages, typically four, five, or six in number. Each is designed to gather information needed to move the project to the next decision point.

Each stage is multifunctional. There is no "R&D stage" or "marketing stage"; each consists of parallel activities by people from different functional areas within the firm. Commitment at each stage costs more than the preceding one. A go/kill decision gate precedes each stage. Gates are the scrums or huddles on the rugby field, the points during the game when the team converges and where all new information is brought together. Gates serve as checkpoints for quality control and for choosing the next play.

Gates are predefined, specifying sets of "must meet" project requirements and "should meet" desirable characteristics. And they designate an output - what comes next. Senior managers from different functions, who "own" the resources the project requires, usually man the gates.

# PROCESS OVERVIEW

Gate 1 screens ideas which originate in basic research, come out of seed or unfounded projects, and are generated from a variety of customer-based and creativity techniques.

Initial screening is the first decision to commit resources to the project, signalling a tentative commitment to it. Gate 1 criteria tend to be qualitative and few in number: strategic alignment; technical feasibility; competitive advantage; and opportunity attractiveness.

## STAGE 1

### - PRELIMINARY INVESTIGATION:

This first and inexpensive stage determines the project's technical and marketplace merits. Stage 1 is a quick review of the project, often completed in 10 to 20 person-days' work effort. Its activities include a preliminary market assessment (a "quickie" study to determine market size, market potential, and possible market acceptance) and a preliminary technical assessment (an in-house appraisal of the proposed product's development and manufacturing feasibility).

The project then moves to Gate 2, a second and somewhat more rigorous screen. If the decision is "go" at this point, the project becomes more expensive, so Gate 2 criteria tend to be more rigorous than in Gate 1. In addition to again invoking the "must meet" criteria of Gate 1, the project must satisfy "should meet" yardsticks applied at Gate 2. Often a scoring model is used to measure for synergies, market attractiveness and competitive situation, elements of product advantage, and profit potential.

## STAGE 2

### - DETAILED INVESTIGATION:

This is where management develops the business case that defines the product and verifies the attractiveness of the project before heavy spending in the next stage, development. It is the critical homework stage, the one research shows is often weakly handled. Typical Stage 2 activities include:

- A user needs-and-wants study to determine the customer's desires and the ideal product.

- Competitive analysis.
- Concept testing, where a representation of the proposed new product is presented to potential customers to gauge acceptance.
- Technical appraisal, which focuses on the feasibility of the project from an economic and technological viewpoint.
- Manufacturing (or operations) appraisal, in which issues of manufacturability, costs to manufacture, and investment required are investigated.
- Legal, patent, and regulatory assessment, in order to remove risks and to map out legally required action.
- Detailed financial analysis, the justification which typically involves a discounted cash flow forecast complete with sensitivity analysis of "what if" risks.

Gate 3, the decision following the work in Stage 2, is the final gate before the development stage. It is the last point at which the project can be killed before incurring heavy spending. Gate 3 also yields a "sign off" on the product definition. Criteria for a pass should be tough and include a rigorous repeat of the Gate 2 "must" and "should" criteria as well as a critical financial and risk-return review.

## STAGE 3

### - DEVELOPMENT:

The "deliverable" at the end of Stage 3 is a lab-tested prototype of the product. Stage 3 emphasises technical work, while marketing and manufacturing activities also proceed in parallel. For example, market analysis and customer feedback continue, with constant customer opinion sought as the product takes shape during development. Meanwhile, detailed market test plans, market launch programs, and production and operations plans take shape. At the same time, the innovation team updates its financial and legal analyses.

At the post-development review of Gate 4, planners recheck the continued attractiveness of the project. Has work proceeded in a quality fashion? Does the developed product conform to the original definition specified at Gate 3?

## STAGE 4

### - TESTING AND VALIDATION:

This stage tests and validates the entire project - the product itself, the production process, customer acceptance, and the economics. Stage 4 requires a number of activities such as

- In-house product tests check product quality and performance under controlled or lab conditions.
- User or field trials verify that the product functions under actual use conditions, and generates customer purchase intent.
- Trial, limited, or pilot production debugs the production process and determines more precise production costs and throughputs.
- Pre-test market, test market, or trial sell gauges customer reaction, measures the effectiveness of the launch plan, and determines expected market share and sales.
- Revised financial analysis checks on the continued economic viability of the project, based on new and more accurate revenue and cost data.

The pre-commercialisation business analysis of Gate 5, the final gate, opens the door to full commercialisation: a market launch and full production or operations start-up. It is the final point at which the project can still be killed. Criteria to pass Gate 5 focus largely on the quality of efforts to date, on the appropriateness of the production and launch plans, and on the financial viability of the product.

## STAGE 5 - FULL PRODUCTION AND MARKET LAUNCH:

This final stage involves putting the marketing launch plan and the production or operations plan in motion. Given a well-thought-out plan of action backed by appropriate resources and barring unforeseen events, it should be clear sailing for the new product. Another new product success!

### POST-IMPLEMENTATION REVIEW

Following commercialisation, often 6 to 18 months, the company terminates the new product project and disbands the team. The product has become a "regular" in the line. At this point, management reviews the project's performance to assess its strengths and weaknesses. A major question is what the company can learn from the project and do better the next time. The project team and leader remain responsible for the success of the project through this post-launch period, right up to the point of the post-implementation review.

### READING FROM THE SAME PAGE

Many investigations, including our NewProd studies, have provided clues and insights into product innovation. We have translated them into the skeleton of a carefully crafted new product process - a game plan which provides a disciplined focus on quality of execution, up-front homework, strong market orientation, and backing by appropriate resources.

Stage-Gate is the blueprint for successful innovation, visible, relatively simple, and easy to understand and communicate. As one manager exclaimed, "At least we're all reading from the same page of the same book."

## MORE INFORMATION

You can find more information and books on Stage-Gate at our web-site "www.u3.dk".

### Stage-Gate Consulting

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